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IV. Solution by M. A. GRUBER, A. M., War Department, Washington, D. C.

In problems where $x^2 + y^2 = \square$, $z^2 + w^2 = \square$, $x^2 + z^2 = \square$, and $y^2 + w^2 = \square$, we have the proportion $x : y = z : w$.

Now take two integers the sum of whose squares equals a square, and arrange them in an identical proportion.

Then take two integers of the same kind and arrange them, underneath the first proportion, in an identical proportion of alternation as compared with the first proportion.

Then find the products, term by term, of these two proportions ; and the four products will be the required numbers.

Take $3^2 + 4^2 = 5^2$, and $5^2 + 12^2 = 13^2$.

$$\begin{array}{r} x : y = z : w \\ 3 : 4 = 3 : 4 \\ 3 : 5 = 12 : 12 \\ \hline 15 : 20 = 36 : 48 \end{array}$$

$$15^2 + 20^2 = 25^2, 36^2 + 48^2 = 60^2, 15^2 + 36^2 = 39^2, 20^2 + 48^2 = 52^2.$$

V. Solution by J. H. DRUMMOND, LL. D., Portland, Me.

Manifestly x and y , and z and w , are the bases and perpendiculars of two different right-angled triangles. Hence $x = m^2 - n^2$, and $y = 2mn$; and $z = p(m^2 - n^2)$, and $w = 2pmn$. But $y^2 + w^2 = \square$. Or $4p^2m^2n^2 + 4m^2n^2 = \square$, or $p^2 + 1 = \square = (\text{say}) (pq - 1)^2$. From which $p = \frac{2q}{q^2 - 1}$. Then $z = \frac{2q(m^2 - n^2)}{q^2 - 1}$, and $w = \frac{2qmn}{q^2 - 1}$, in which m , n , and q may be any numbers, $q > 1$, and $m > n$.

Also solved by A. H. BELL, CHARLES C. CROSS, ELMER SCHUYLER, and G. B. M. ZERR.

PROBLEMS FOR SOLUTION.

ARITHMETIC.

112. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

The cost of an article is \$4. $\frac{.297}{1.003}$. The selling price is \$6. $\frac{1.000}{.33337}$. What is the gain % ?

113. Proposed by B. F. SINE, Principal of Normal School, Capon Bridge, W. Va.

In what time can a note of \$5280, bearing 6% interest, be paid by paying \$600 a year ? [Solve by arithmetic].

*** Solutions of these problems should be sent to B. F. Finkel not later than June 10.